

Waste Water Energy Recovery Assistance Program

PROGRAM OPPORTUNITY NOTICE (PON): PON-ENE-2014-025

INTRODUCTION

Thermal energy is used for heating and cooling buildings, as well as for certain industrial processes. Today almost all of this energy is generated from fossil fuels like natural gas, propane or heating oil. But there is an expanding opportunity to use local renewable energy resources such as sunlight, sustainable biomass, the earth or ambient air. Technologies to use these renewable resources have been around for decades and are deployed around the world, but have recently become increasingly efficient, cost-effective and clean. One renewable technology that has received little attention in the United States to-date is “waste water energy recovery” (WWER). WWER is the process by which heat energy is transferred from or to waste water for heating or cooling applications, respectively.

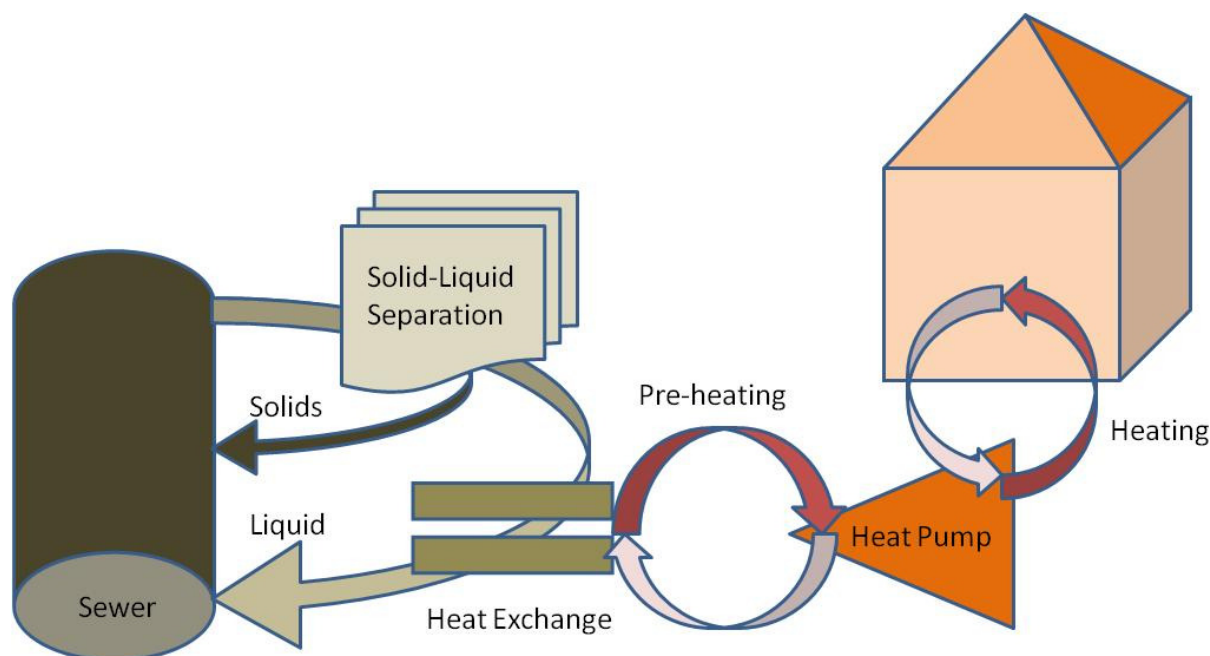
Much of the energy used to heat water for domestic uses¹ and industrial processes is lost as the heated water flows down the drain. WWER projects aim to re-capture some of that wasted energy to heat buildings and to use the waste water as a heat sink for cooling loads, similar to a ground-source heat pump using groundwater to heat and cool buildings. In contrast, however, WWER has the potential to be more efficient than ground-source heat pumps because the sewage water in pipes is generally much warmer than ground water. Additionally, WWER uses the pre-existing waste water pipes present in a building or sewer, rather than drilling for new pipes into the ground, and can be applied within a building or within a larger waste water system such as municipal sewer systems.

There are several components of WWER that function together in order to accomplish the transfer of energy to or from the waste water. The main components of a WWER system are the sewage source, the separation mechanism for solids and liquids, the

¹ Showers, laundering, dishwashing, etc.

heat exchanger, and the heat pump. Air- and water-source heat pumps have been widely used for decades and are beginning to be more widely deployed as their efficiency gains recognition. The innovation in WWER is using heat pumps in a new setting, namely in sewage. WWER technology works by adapting the screening technologies already in use by sewer systems for use in energy recovery applications.

The following is a diagram of a waste water energy recovery system with the building receiving the heating energy on the right. Note that the waste water is always maintained in its own independent loop on the left; after traveling through a screening and/or grinding process for solid-liquid separation, it flows through the heat exchanger and returns to the sewer. The energy is transferred to the fluid in the heat exchanger, to then enter the building and brought up to sufficient temperature through a heat pump to heat the building. Thus, the waste water never actually enters the building or its heating system.



WWER has been deployed in China, Germany and Switzerland, but only at a very few sites in the United States. These few sites have typically deployed WWER within the waste water treatment facility (WWTF) in the treated effluent as it is discharged, primarily because this is the cleanest point in a sewer system. However, deploying WWER at this location greatly limits its potential because WWTFs are typically located far from buildings having high heating and cooling loads.

In order to develop experience and familiarity with WWER in Massachusetts, the Massachusetts Department of Energy Resources (DOER) Waste Water Energy Recovery Assistance Program (WWER Program) provides financial assistance to WWER projects for

technical studies or implementation. By assisting the first WWER projects, DOER is working to build a new alternative thermal technology market that has the potential to reduce energy costs, increase energy supply diversity, and reduce greenhouse gas emissions.

PROGRAM OUTLINE

DOER has allocated \$1 million from 2011 Alternative Compliance Payments (ACP) to support WWER projects in the Commonwealth. The goal of this WWER Program goal is to demonstrate innovative applications of this energy technology and to document the resulting energy and cost savings.

The WWER Program supports technical assistance studies, demonstration projects seeking to track and measure energy savings and/or potential, or WWER project implementation. Because DOER seeks to build a market for this relatively unknown technology, the WWER Program also will support installation costs associated with implementing a WWER project.

SELECTION OF AWARDEES

Applications will be considered as follows:

- 1) Only complete applications will be considered. Any application not completed in its entirety, including all requested attachments in the specified file formats, will be rejected. Applicants will be notified if their application is rejected, although there is no guarantee that notification will occur in time for a re-submission to be considered.
- 2) The maximum grant available per application is \$50,000 for technical assistance and \$500,000 for project investment assistance.
- 3) Applications will be reviewed and awards made based on the order in which completed applications are received until all available funds are disbursed.
- 4) Qualifying projects must be located within a public waste water system; this means that any private sector applicants must have an agreement with the waste water system's governing body.² Projects must study or install the WWER technology at a pump station or within the collection system for existing waste water infrastructure. For WWTFs under design, construction, or major renovation, inclusion of WWER at the WWTF may be studied or installed if there is a sufficient heating /cooling load at the WWTF or at an adjacent property; preference will be given to applications that include use of the recovered energy at an independent, adjacent location.
- 5) Priority will be given to WWER projects offsetting the use of heating oil, propane or electric resistance heating, since those will likely deliver the highest cost efficiencies. WWER project offsetting natural gas heating will however be considered if they deliver significant additional benefits, e.g. as a demonstration project.

² This could be the municipal government or a waste water district.

6) Technical Assistance

- a) Applicants may apply for technical assistance grants for feasibility, engineering and/or design studies of a WWER project. Technical assistance grants may also be used for impermanent demonstration projects seeking to track and measure energy savings and/or potential.
- b) A single applicant may receive a value of up to **\$50,000** of technical assistance services.
- c) Studies must include the evaluation of one or more of the following:
 - i) Evaluation of feasibility of a WWER project, including testing of the technology, estimated energy and cost savings, and scope of work and estimated project timeline;
 - ii) Engineering study to include WWER including testing of the technology, estimated energy and cost savings, and scope of work and estimated project timeline;
 - iii) Design study including testing of the technology, estimated energy and cost savings, and scope of work and estimated project timeline.

7) Investment Assistance

- a) Applicants may apply for investment assistance grants for the implementation of a WWER project. Applications can include assistance with equipment and installation costs.
- b) A single applicant may receive a value of up to **\$500,000** of investment assistance.
- c) Applicants are expected to contribute matching funds of **at least 25%** towards total project costs. The cost share requirement may be waived upon the applicant's commitment to dedicate the first three (3) years of operational cost savings derived from the project funded with a WWER grant to other DOER-approved energy efficiency or renewable energy projects within a public waste water system. DOER will administer the dedication, oversight, and verification of all operational cost savings that are utilized to qualify for the waiving of the cost share.
- d) Investment assistance grants will only be awarded to project proposals based on feasibility and design studies deemed satisfactory by DOER. These studies can be the result of the WWER Assistance Program, or can have been commissioned independently of the WWER Assistance Program. Studies cannot have been conducted more than three years prior to application for investment assistance.

- e) DOER will evaluate proposals based on:
- i) Energy impacts, including reductions in building energy consumption and greenhouse gas emissions;
 - ii) Shovel-readiness, including viability, cost-effectiveness, and appropriateness of project or study; and
 - iii) Effective use of funds.

GRANT TERMS

1. Grantees agree to comply with all terms and conditions in a fully executed contract with DOER, in addition to the conditions outlined below.
2. Grants may be paid in installments and based on milestones predetermined by DOER, or may be paid in a lump sum after the WWER system has been installed and commissioned. The DOER reserves the right to inspect finished installations before final payment of grant funds. Grants are paid to reimburse for costs incurred and may not be applied to work conducted prior to the term of the grant contract. In no case would DOER funding that would, in DOER's sole determination, exceed total project costs.
3. If a facility receives funding through this opportunity, it agrees to:
 - Contract with DOER to receive funding;
 - File quarterly reports throughout the term of the contract;
 - File a final report with DOER, including a project fact sheet to be made publicly available.
4. If awarded an investment assistance grant, the applicant also agrees to:
 - Use a third-party to ensure that equipment/systems are correctly specified, budgeted, designed, installed and properly commissioned; note that these costs may be included in the total project costs in the application.
 - Provide training to maintenance staff to operate and maintain system performance, including creation of a maintenance plan or standard operating procedure (SOP) documentation.
 - Conduct an education and outreach component to the project, which can include public presentations, web-based materials, or tours and presentations of the completed project.

PROCUREMENT CALENDAR

DOER Issues PON	February 28th, 2014
BEGIN ACCEPTING APPLICATIONS	April 7, 2014 10:00 AM

- This PON is available at www.comm-pass.com as ENE-PON-2014-025 and www.mass.gov/energy/greencommunities under "Publications and Reports".
- ALL questions must be sent to Bram Claeys at Bram.claeys@state.ma.us by 5pm March 21, 2014. Directions for posting question are contained in Appendix E.

SUBMISSION INFORMATION

- Applicants must submit an electronic copy of the application to bram.claeys@state.ma.us. Please put "WWER Assistance Program" in the subject line of the email. The date/time of electronic submission via e-mail will serve as the official time of receipt of the application. Receipt of application will be confirmed prior to its review.
- **All information requested in the application MUST be provided, including all required attachments specified for the project:**
 - Attachment A: Applicant and Site Information;
 - Attachment B: Technical Assistance, OR
 - Attachment C: Investment Assistance;
 - Attachment D: Certification of Application.

ATTACHMENT A – APPLICANT AND SITE INFORMATION**APPLICANT INFORMATION**

Entity Name	Waste Water Entity Name
Contact Name	Contact Name
Contact Title	Contact Title
Email Address	Email Address
Telephone	Telephone
Type of Assistance (Technical or Investment)	Funding Requested (\$)

SITE INFORMATION

WWER Site Name	Heating/Cooling Recipient Building
Street Address	Street Address
City/Town	City/Town
Electric Utility	Electric Utility
Average Flow (MGD)	Current Heating Fuel
Year(s) for Average Flow	Natural Gas Utility (if applicable)

ATTACHMENT B – TECHNICAL ASSISTANCE

Only for applicants seeking Technical Assistance

You must address each of the following items in order for the application to be deemed complete.

1. Study Information

- Total WWER Feasibility, Engineering and/or Design Study Cost: \$_____
- Contractor for WWER Study: _____

2. Describe the WWER project concept, including scope of the study, potential capacity of WWER project, technology, project status, etc.
3. Describe the location of the WWER within the public waste water system relative to the WWTF, pumping stations, and the collection system.
4. Please describe the agreement between the public waste water system providing the resource for WWER and the facility(s) that will be the recipients of that energy. If a written agreement has been completed, please include that in the application.
5. Describe motivation to investigate WWER.
6. Provide a schedule for study completion.

ATTACHMENT C – INVESTMENT ASSISTANCE

Only for applicants seeking Investment Assistance

You must address each of the following items in order for the application to be deemed complete.

1. Project Cost Information

- Total WWER Project Cost: \$_____
- Total Estimated Annual Cost Savings: \$_____

2. Projected Energy Savings Information

- Site Energy Consumption: _____ kWh + _____ heating units for _____ year(s)
- Fuel Type to be Displaced by WWER: _____
- Estimated Annual Thermal Output of Proposed WWER System: _____ Units:

- Estimated Annual Reduction in Displaced Fuel: _____ Units: _____ (BTUs, kWh, gallons, etc.)

3. Summarize the WWER project, including description, size, technology, project status, etc.

4. Describe the location of the WWER within the public waste water system relative to the WWTF, pumping stations, and the collection system.

5. Please describe the agreement between the public waste water system providing the resource for WWER and the facility(s) that will be the recipients of that energy. If a written agreement has been completed, please include that in the application.

6. Include the feasibility, engineering and design studies for the WWER project as attachments.

7. Provide a tentative schedule for project installation and completion.

8. Describe your motivation to pursue WWER.

9. Discuss how you will use an owner's agent to ensure that equipment/systems are correctly specified, budgeted, designed, installed and properly commissioned.
10. Describe your plan for providing training to maintenance staff to operate and maintain system performance, including creation of a maintenance plan or standard operating procedure (SOP) documentation.
11. Discuss your plan for education and outreach for proposed project; this can include presentations, web-based materials, or tours and presentations of the completed project.

ATTACHMENT D

CERTIFICATION OF APPLICATION

The Certification of Application below must be provided as a scanned pdf with signature for each public entity applying for this program.

CERTIFICATION OF APPLICATION

I hereby confirm that I am duly authorized to submit this application on behalf of the drinking/wastewater treatment facility/district of _____

_ and that all information contained in this application to the Waste Water Energy Recovery Assistance Program is true and accurate.

Name Date

TITLE

ATTACHMENT E - ASKING QUESTIONS

- This application information is available at www.comm-PASS.com as PON-ENE-2014-025 and www.mass.gov/energy/greencommunities under "Publications and Reports."
- **Due to the transition of Compass to the new Commbuys procurement system, ALL questions must be emailed to Bram Claeys at bram.claeys@state.ma.us by 5pm March 21, 2014.** All answers, notifications, releases and amendments to this grant opportunity will be posted at www.mass.gov/energy/greencommunities under "Publications and Reports."

NOTICE: COMPASS WILL BECOME "COMMBUYS" ON MARCH 24, 2014. WHILE THIS POSTING WILL BE AVAILABLE ON COMPASS UNTIL APRIL 7, THERE IS NO ABILITY TO INTERACT THROUGH THE COMPASS FORUM OR SMART BID AFTER FEBRUARY 28, 2014.

PLEASE CHECK IN THROUGH EMAIL AND/OR THE DOER WEBSITE FOR ANY COMMUNICATION, AMENDMENTS, AND QUESTIONS AND ANSWERS REGARDING THIS GRANT OPPORTUNITY.